1. Factor the polynomial below completely, knowing that $x+3$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 16x^4 + 16x^3 - 105x^2 - 9x + 54$$

   A. $z_1 \in [-2.2, 0.1]$, $z_2 \in [-1.19, 0.23]$, $z_3 \in [0.4, 0.94]$, and $z_4 \in [2.36, 3.36]$

   B. $z_1 \in [-3.3, -2.7]$, $z_2 \in [-2.54, -1.67]$, $z_3 \in [0.02, 0.66]$, and $z_4 \in [2.36, 3.36]$

   C. $z_1 \in [-3.3, -2.7]$, $z_2 \in [-1.19, 0.23]$, $z_3 \in [0.4, 0.94]$, and $z_4 \in [1.68, 2.69]$

   D. $z_1 \in [-3.3, -2.7]$, $z_2 \in [-1.63, -0.84]$, $z_3 \in [1.24, 1.45]$, and $z_4 \in [1.68, 2.69]$

   E. $z_1 \in [-2.2, 0.1]$, $z_2 \in [-1.63, -0.84]$, $z_3 \in [1.24, 1.45]$, and $z_4 \in [2.36, 3.36]$

---

2. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{15x^3 - 97x^2 + 168x - 77}{x - 4}$$

   A. $a \in [57, 68]$, $b \in [-337, -332]$, $c \in [1515, 1519]$, and $r \in [-6142, -6136]$.

   B. $a \in [13, 16]$, $b \in [-163, -155]$, $c \in [796, 797]$, and $r \in [-3269, -3257]$.

   C. $a \in [13, 16]$, $b \in [-37, -35]$, $c \in [18, 23]$, and $r \in [3, 4]$.

   D. $a \in [13, 16]$, $b \in [-53, -47]$, $c \in [10, 17]$, and $r \in [-45, -37]$.

   E. $a \in [57, 68]$, $b \in [142, 144]$, $c \in [737, 743]$, and $r \in [2883, 2885]$.

---

3. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 25x^3 + 75x^2 + 56x + 12$$

A. $z_1 \in [-0.2, 0.2]$, $z_2 \in [0.9, 2.6]$, and $z_3 \in [2.78, 3.85]$

B. $z_1 \in [1.49, 1.78]$, $z_2 \in [0.9, 2.6]$, and $z_3 \in [2.36, 2.61]$

C. $z_1 \in [-2.59, -2.42]$, $z_2 \in [-3.5, -1.7]$, and $z_3 \in [-2.5, -1.58]$

D. $z_1 \in [0.33, 0.79]$, $z_2 \in [0, 1.3]$, and $z_3 \in [1.92, 2.46]$

E. $z_1 \in [-2.08, -1.76]$, $z_2 \in [-0.8, 0.1]$, and $z_3 \in [-0.43, -0.12]$

---

4. What are the *possible Integer* roots of the polynomial below?

$$f(x) = 6x^4 + 3x^3 + 2x^2 + 2x + 4$$

A. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 4}{\pm 1, \pm 2, \pm 3, \pm 6}$

B. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 3, \pm 6}{\pm 1, \pm 2, \pm 4}$

C. $\pm 1, \pm 2, \pm 3, \pm 6$

D. $\pm 1, \pm 2, \pm 4$

E. There is no formula or theorem that tells us all possible Integer roots.

---

5. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 15x^3 + 56x^2 - 105x - 50$$

A. $z_1 \in [-6, -4]$, $z_2 \in [-0.81, -0.19]$, and $z_3 \in [0.8, 1.8]$

B. $z_1 \in [-1.67, -0.67]$, $z_2 \in [0.19, 0.57]$, and $z_3 \in [4.9, 5.8]$

C. $z_1 \in [-6, -4]$, $z_2 \in [-2.86, -2.03]$, and $z_3 \in [-0.1, 1.3]$

D. $z_1 \in [-1.6, 1.4]$, $z_2 \in [2.21, 2.72]$, and $z_3 \in [4.9, 5.8]$

E. $z_1 \in [-6, -4]$, $z_2 \in [-0.06, 0.29]$, and $z_3 \in [4.9, 5.8]$

---

6. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{4x^3 - 48x + 66}{x + 4}$$

A. $a \in [-20, -15], b \in [61, 73], c \in [-308, -302]$, and $r \in [1278, 1285]$.

B. $a \in [4, 7], b \in [16, 17], c \in [14, 22]$, and $r \in [129, 137]$.

C. $a \in [-20, -15], b \in [-68, -57], c \in [-308, -302]$, and $r \in [-1157, -1149]$.

D. $a \in [4, 7], b \in [-16, -10], c \in [14, 22]$, and $r \in [2, 5]$.

E. $a \in [4, 7], b \in [-27, -17], c \in [50, 55]$, and $r \in [-197, -190]$.

---

7. Factor the polynomial below completely, knowing that $x+2$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 12x^4 - 43x^3 - 21x^2 + 166x - 120$$

A. $z_1 \in [-3.47, -2.46]$, $z_2 \in [-1.71, -1], z_3 \in [-1.56, -1.13]$, and $z_4 \in [1.5, 2.6]$

B. $z_1 \in [-2.22, -1.47]$, $z_2 \in [0.11, 1.16], z_3 \in [0.44, 1.05]$, and $z_4 \in [2.7, 3.2]$

C. $z_1 \in [-4.53, -3.35]$, $z_2 \in [-3.93, -2.74], z_3 \in [-0.56, -0.3]$, and $z_4 \in [1.5, 2.6]$

D. $z_1 \in [-3.47, -2.46]$, $z_2 \in [-1.16, -0.7], z_3 \in [-0.93, -0.52]$, and $z_4 \in [1.5, 2.6]$

E. $z_1 \in [-2.22, -1.47]$, $z_2 \in [1.05, 1.59], z_3 \in [1.32, 1.66]$, and $z_4 \in [2.7, 3.2]$

---

8. What are the *possible Rational* roots of the polynomial below?

$$f(x) = 4x^3 + 3x^2 + 7x + 6$$

A. $\pm 1, \pm 2, \pm 4$

B. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 4}{\pm 1, \pm 2, \pm 3, \pm 6}$

C. $\pm 1, \pm 2, \pm 3, \pm 6$

D. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 3, \pm 6}{\pm 1, \pm 2, \pm 4}$

E. There is no formula or theorem that tells us all possible Rational roots.

---

9. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{6x^3 + 4x^2 - 34x + 28}{x + 3}$$

A. $a \in [-20, -9], \; b \in [56, 65], \; c \in [-213, -206], \;$ and $r \in [649, 653]$.

B. $a \in [6, 10], \; b \in [-20, -19], \; c \in [43, 47], \;$ and $r \in [-158, -148]$.

C. $a \in [6, 10], \; b \in [-17, -8], \; c \in [2, 9], \;$ and $r \in [-1, 6]$.

D. $a \in [6, 10], \; b \in [18, 26], \; c \in [32, 36], \;$ and $r \in [119, 127]$.

E. $a \in [-20, -9], \; b \in [-51, -46], \; c \in [-186, -177], \;$ and $r \in [-526, -517]$.

---

10. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{20x^3 + 63x^2 - 24}{x + 3}$$

A. $a \in [-67, -57], b \in [239, 245], c \in [-730, -721], \;$ and $r \in [2163, 2165]$.

B. $a \in [20, 26], b \in [3, 7], c \in [-10, -7], \;$ and $r \in [0, 11]$.

C. $a \in [20, 26], b \in [-17, -14], c \in [62, 70], \;$ and $r \in [-303, -294]$.

D. $a \in [-67, -57], b \in [-119, -114], c \in [-354, -349], \;$ and $r \in [-1085, -1073]$.

E. $a \in [20, 26], b \in [119, 127], c \in [364, 371], \;$ and $r \in [1080, 1086]$.

---

11. Factor the polynomial below completely, knowing that $x-2$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 20x^4 - 143x^3 + 212x^2 + 33x - 90$$

A. $z_1 \in [-2, -1.6]$, $z_2 \in [0.98, 1.85]$, $z_3 \in [1.93, 2.08]$, and $z_4 \in [4.45, 5.68]$

B. $z_1 \in [-5.3, -3.4]$, $z_2 \in [-2.67, -1.65]$, $z_3 \in [-1.14, -0.62]$, and $z_4 \in [-0.5, 1.45]$

C. $z_1 \in [-1.5, 0.4]$, $z_2 \in [0.49, 1.03]$, $z_3 \in [1.93, 2.08]$, and $z_4 \in [4.45, 5.68]$

D. $z_1 \in [-5.3, -3.4]$, $z_2 \in [-2.67, -1.65]$, $z_3 \in [-0.68, 0.13]$, and $z_4 \in [2.83, 3.55]$

E. $z_1 \in [-5.3, -3.4]$, $z_2 \in [-2.67, -1.65]$, $z_3 \in [-1.51, -1.1]$, and $z_4 \in [0.65, 2.43]$

---

12. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{10x^3 - 64x^2 + 74x - 25}{x - 5}$$

A. $a \in [9, 14]$, $b \in [-15, -6]$, $c \in [2, 5]$, and $r \in [-9, -1]$.

B. $a \in [9, 14]$, $b \in [-119, -108]$, $c \in [642, 645]$, and $r \in [-3249, -3242]$.

C. $a \in [43, 53]$, $b \in [-320, -306]$, $c \in [1641, 1645]$, and $r \in [-8246, -8238]$.

D. $a \in [43, 53]$, $b \in [180, 194]$, $c \in [1000, 1007]$, and $r \in [4994, 4996]$.

E. $a \in [9, 14]$, $b \in [-32, -17]$, $c \in [-24, -21]$, and $r \in [-119, -110]$.

---

13. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 16x^3 + 40x^2 + x - 30$$

A. $z_1 \in [-0.65, -0.05]$, $z_2 \in [1.8, 2.3]$, and $z_3 \in [4.98, 5.07]$

B. $z_1 \in [-2.18, -1.53]$, $z_2 \in [-0.83, -0.62]$, and $z_3 \in [1.25, 1.67]$

C. $z_1 \in [-1.67, -1.19]$, $z_2 \in [0.74, 1.09]$, and $z_3 \in [1.9, 2.6]$

D. $z_1 \in [-0.91, -0.62]$, $z_2 \in [1.04, 1.44]$, and $z_3 \in [1.9, 2.6]$

E. $z_1 \in [-2.18, -1.53]$, $z_2 \in [-1.34, -1.21]$, and $z_3 \in [0.49, 0.83]$

---

14. What are the *possible Integer* roots of the polynomial below?

$$f(x) = 7x^3 + 3x^2 + 4x + 4$$

A. $\pm 1, \pm 2, \pm 4$

B. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 4}{\pm 1, \pm 7}$

C. All combinations of: $\dfrac{\pm 1, \pm 7}{\pm 1, \pm 2, \pm 4}$

D. $\pm 1, \pm 7$

E. There is no formula or theorem that tells us all possible Integer roots.

---

15. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 15x^3 + 71x^2 + 32x - 48$$

A. $z_1 \in [-0.31, 0]$, $z_2 \in [3.4, 5.2]$, and $z_3 \in [2.8, 5.1]$

B. $z_1 \in [-1.74, -1.25]$, $z_2 \in [0, 1.2]$, and $z_3 \in [2.8, 5.1]$

C. $z_1 \in [-4.13, -3.86]$, $z_2 \in [-1.2, -0.2]$, and $z_3 \in [1.4, 2.1]$

D. $z_1 \in [-0.81, -0.46]$, $z_2 \in [0.9, 2.3]$, and $z_3 \in [2.8, 5.1]$

E. $z_1 \in [-4.13, -3.86]$, $z_2 \in [-2.6, -1.1]$, and $z_3 \in [0.3, 1.1]$

---

16. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{20x^3 + 105x^2 - 122}{x + 5}$$

A. $a \in [-103, -96], b \in [598, 607], c \in [-3033, -3021]$, and $r \in [15001, 15007]$.

B. $a \in [17, 23], b \in [200, 209], c \in [1024, 1033]$, and $r \in [4999, 5011]$.

C. $a \in [17, 23], b \in [-2, 9], c \in [-25, -22]$, and $r \in [-2, 10]$.

D. $a \in [-103, -96], b \in [-400, -393], c \in [-1977, -1970]$, and $r \in [-10001, -9989]$.

E. $a \in [17, 23], b \in [-15, -14], c \in [88, 95]$, and $r \in [-665, -656]$.

---

17. Factor the polynomial below completely, knowing that $x - 4$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 8x^4 + 14x^3 - 163x^2 - 129x + 180$$

A. $z_1 \in [-4.9, -3.6]$, $z_2 \in [-3.06, -2.98], z_3 \in [0.27, 0.47]$, and $z_4 \in [4.4, 6.6]$

B. $z_1 \in [-4.9, -3.6]$, $z_2 \in [-1.49, -1.28], z_3 \in [0.66, 0.7]$, and $z_4 \in [4.4, 6.6]$

C. $z_1 \in [-5.6, -4.8]$, $z_2 \in [-1.51, -1.49], z_3 \in [0.7, 0.79]$, and $z_4 \in [2.9, 4.2]$

D. $z_1 \in [-5.6, -4.8]$, $z_2 \in [-0.68, -0.65], z_3 \in [1.25, 1.37]$, and $z_4 \in [2.9, 4.2]$

E. $z_1 \in [-4.9, -3.6]$, $z_2 \in [-0.78, -0.72], z_3 \in [1.49, 1.51]$, and $z_4 \in [4.4, 6.6]$

---

18. What are the *possible Integer* roots of the polynomial below?

$$f(x) = 3x^4 + 4x^3 + 6x^2 + 3x + 5$$

A. $\pm 1, \pm 5$

B. All combinations of: $\dfrac{\pm 1, \pm 5}{\pm 1, \pm 3}$

C. All combinations of: $\dfrac{\pm 1, \pm 3}{\pm 1, \pm 5}$

D. $\pm 1, \pm 3$

E. There is no formula or theorem that tells us all possible Integer roots.

---

19. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{15x^3 + 70x^2 + 105x + 53}{x + 2}$$

A. $a \in [-30, -29], \ b \in [128, 137], \ c \in [-163, -151], \text{ and } r \in [358, 366].$

B. $a \in [14, 17], \ b \in [97, 101], \ c \in [298, 307], \text{ and } r \in [663, 668].$

C. $a \in [14, 17], \ b \in [39, 45], \ c \in [23, 27], \text{ and } r \in [3, 4].$

D. $a \in [14, 17], \ b \in [20, 29], \ c \in [30, 33], \text{ and } r \in [-37, -31].$

E. $a \in [-30, -29], \ b \in [9, 11], \ c \in [123, 128], \text{ and } r \in [296, 309].$

---

20. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{6x^3 + 26x^2 - 29}{x + 4}$$

A. $a \in [3, 10], b \in [2, 4], c \in [-11, -5], \text{ and } r \in [-6, 5].$

B. $a \in [-27, -20], b \in [117, 124], c \in [-488, -487], \text{ and } r \in [1917, 1927].$

C. $a \in [3, 10], b \in [-9, 1], c \in [18, 21], \text{ and } r \in [-129, -128].$

D. $a \in [-27, -20], b \in [-73, -64], c \in [-280, -274], \text{ and } r \in [-1151, -1146].$

E. $a \in [3, 10], b \in [47, 52], c \in [194, 202], \text{ and } r \in [769, 776].$

21. Factor the polynomial below completely, knowing that $x+5$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 15x^4 + 139x^3 + 383x^2 + 333x + 90$$

A. $z_1 \in [-5.01, -4.54]$, $z_2 \in [-3.73, -2.62]$, $z_3 \in [-1.6, 1.2]$, and $z_4 \in [-1.19, 0.12]$

B. $z_1 \in [0.37, 0.91]$, $z_2 \in [0.35, 0.89]$, $z_3 \in [2.4, 3.6]$, and $z_4 \in [3.93, 5.1]$

C. $z_1 \in [-0.16, 0.36]$, $z_2 \in [1.98, 3.21]$, $z_3 \in [2.4, 3.6]$, and $z_4 \in [3.93, 5.1]$

D. $z_1 \in [-5.01, -4.54]$, $z_2 \in [-3.73, -2.62]$, $z_3 \in [-4, -0.9]$, and $z_4 \in [-2.54, -1.2]$

E. $z_1 \in [1.45, 1.87]$, $z_2 \in [1.62, 1.94]$, $z_3 \in [2.4, 3.6]$, and $z_4 \in [3.93, 5.1]$

---

22. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{6x^3 - 1x^2 - 20x + 14}{x + 2}$$

A. $a \in [6, 9]$, $b \in [-20.2, -15.3]$, $c \in [35, 40]$, and $r \in [-99, -93]$.

B. $a \in [6, 9]$, $b \in [-13.5, -8.7]$, $c \in [5, 13]$, and $r \in [-3, 4]$.

C. $a \in [-17, -11]$, $b \in [-30.2, -22.4]$, $c \in [-73, -68]$, and $r \in [-128, -122]$.

D. $a \in [6, 9]$, $b \in [9.7, 12.2]$, $c \in [0, 3]$, and $r \in [12, 22]$.

E. $a \in [-17, -11]$, $b \in [22.7, 24.5]$, $c \in [-69, -65]$, and $r \in [142, 152]$.

---

23. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 8x^3 + 38x^2 + 15x - 36$$

A. $z_1 \in [-4.08, -3.9]$, $z_2 \in [-1.8, -1.23]$, and $z_3 \in [0.1, 0.9]$

B. $z_1 \in [-1.37, -1.16]$, $z_2 \in [0.22, 0.87]$, and $z_3 \in [2.3, 4.9]$

C. $z_1 \in [-0.64, -0.36]$, $z_2 \in [2.91, 3.23]$, and $z_3 \in [2.3, 4.9]$

D. $z_1 \in [-0.86, -0.55]$, $z_2 \in [1.36, 1.85]$, and $z_3 \in [2.3, 4.9]$

E. $z_1 \in [-4.08, -3.9]$, $z_2 \in [-1.2, -0.15]$, and $z_3 \in [1, 2.4]$

---

24. What are the *possible Integer* roots of the polynomial below?

$$f(x) = 4x^3 + 7x^2 + 5x + 5$$

A. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 4}{\pm 1, \pm 5}$

B. $\pm 1, \pm 5$

C. $\pm 1, \pm 2, \pm 4$

D. All combinations of: $\dfrac{\pm 1, \pm 5}{\pm 1, \pm 2, \pm 4}$

E. There is no formula or theorem that tells us all possible Integer roots.

---

25. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 8x^3 - 22x^2 - 65x + 100$$

A. $z_1 \in [-4, -3]$, $z_2 \in [-0.96, -0.67]$, and $z_3 \in [0.1, 2.1]$

B. $z_1 \in [-4, -3]$, $z_2 \in [-0.74, -0.29]$, and $z_3 \in [4.9, 5.1]$

C. $z_1 \in [-3.5, -1.5]$, $z_2 \in [1.21, 1.28]$, and $z_3 \in [3.8, 4.2]$

D. $z_1 \in [-4, -3]$, $z_2 \in [-1.31, -1.08]$, and $z_3 \in [2.1, 3]$

E. $z_1 \in [-2.4, 2.6]$, $z_2 \in [0.79, 0.87]$, and $z_3 \in [3.8, 4.2]$

---

26. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{12x^3 - 36x + 29}{x + 2}$$

A. $a \in [12, 15], b \in [-26, -18], c \in [10, 14]$, and $r \in [5, 7]$.

B. $a \in [-25, -16], b \in [-48, -47], c \in [-135, -129]$, and $r \in [-240, -232]$.

C. $a \in [-25, -16], b \in [40, 54], c \in [-135, -129]$, and $r \in [293, 294]$.

D. $a \in [12, 15], b \in [-42, -32], c \in [67, 77]$, and $r \in [-188, -182]$.

E. $a \in [12, 15], b \in [21, 29], c \in [10, 14]$, and $r \in [47, 55]$.

---

27. Factor the polynomial below completely, knowing that $x - 5$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 6x^4 - 19x^3 - 81x^2 + 90x + 200$$

A. $z_1 \in [-3.1, -1.7]$, $z_2 \in [-1.43, -1.12]$, $z_3 \in [1.75, 2.23]$, and $z_4 \in [4.3, 6.3]$

B. $z_1 \in [-1.3, -0.4]$, $z_2 \in [-0.6, 0.2]$, $z_3 \in [1.75, 2.23]$, and $z_4 \in [4.3, 6.3]$

C. $z_1 \in [-6.8, -4.8]$, $z_2 \in [-2.63, -1.81]$, $z_3 \in [0.33, 0.66]$, and $z_4 \in [0.2, 2]$

D. $z_1 \in [-6.8, -4.8]$, $z_2 \in [-2.63, -1.81]$, $z_3 \in [0.58, 1.18]$, and $z_4 \in [4.3, 6.3]$

E. $z_1 \in [-6.8, -4.8]$, $z_2 \in [-2.63, -1.81]$, $z_3 \in [1.07, 1.78]$, and $z_4 \in [1.4, 3.4]$

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28. What are the *possible Rational* roots of the polynomial below?

$$f(x) = 2x^2 + 4x + 4$$

A. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 4}{\pm 1, \pm 2}$

B. All combinations of: $\dfrac{\pm 1, \pm 2}{\pm 1, \pm 2, \pm 4}$

C. $\pm 1, \pm 2$

D. $\pm 1, \pm 2, \pm 4$

E. There is no formula or theorem that tells us all possible Rational roots.

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29. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{12x^3 + 17x^2 - 24x - 18}{x + 2}$$

A. $a \in [8, 16], \; b \in [-8, -5], \; c \in [-11, -5],$ and $r \in [-2, 10]$.

B. $a \in [8, 16], \; b \in [38, 42], \; c \in [56, 61],$ and $r \in [96, 102]$.

C. $a \in [-26, -19], \; b \in [61, 70], \; c \in [-160, -152],$ and $r \in [288, 293]$.

D. $a \in [8, 16], \; b \in [-22, -17], \; c \in [29, 34],$ and $r \in [-121, -116]$.

E. $a \in [-26, -19], \; b \in [-35, -28], \; c \in [-87, -83],$ and $r \in [-192, -189]$.

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30. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder r.

$$\frac{6x^3 + 35x^2 - 127}{x + 5}$$

A. $a \in [6, 10], b \in [4, 6], c \in [-32, -21],$ and $r \in [-2, -1]$.

B. $a \in [6, 10], b \in [65, 67], c \in [316, 329],$ and $r \in [1496, 1502]$.

C. $a \in [6, 10], b \in [-5, 1], c \in [5, 9],$ and $r \in [-163, -160]$.

D. $a \in [-30, -28], b \in [183, 190], c \in [-926, -922],$ and $r \in [4497, 4503]$.

E. $a \in [-30, -28], b \in [-117, -107], c \in [-578, -574],$ and $r \in [-3002, -3001]$.
